



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/675,733	09/30/2003	Ramesh Varadaraj	RDH-0314	6371

7590 01/25/2006  
ExxonMobil Research and Engineering Company  
P.O. Box 900  
Annandale, NJ 08801-0900

EXAMINER
----------

HYUN, PAUL SANG HWA

ART UNIT	PAPER NUMBER
----------	--------------

1743

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/675,733

Applicant(s)

VARADARAJ ET AL.

Examiner

Paul S. Hyun

Art Unit

1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Double Patenting***

Applicant is advised that should claim 10 be found allowable, claim 14 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim 14 is a duplicate of claim 10 because methyl benzene is a synonym of toluene. Both names refer to the same chemical compound.

### ***Claim Objections***

Claim 7 is objected to because of the following informalities: It appears that Applicants intended "cyclopetane" to be "cyclopentane" in line 2 of the claim. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-14 are rejected under 35 U.S.C. 112, first paragraph, because the Specification, while being enabling for a method for determining the effectiveness of an asphaltene dispersant by comparing the difference in the rate of precipitation produced by a sample containing a dispersant and a sample missing a dispersant, wherein each sample is prepared using different batches of extracted asphaltene, does not reasonably provide enablement for the said method conducted by using the same batch of asphaltene. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

It is not clear how "said extracted asphaltene" recited in step (d) of claim 1 can be dissolved again in "said hydrocarbon solvent" without first recovering the "said extracted asphaltene" that was dissolved in step (b) of the claim. The terms "said extracted asphaltene" and "said hydrocarbon solvent" recited in step (d) of the claim refer to the same "extracted asphaltene" and "hydrocarbon solvent" used in step (b) of the claim. It appears from the Specification that Applicants intended the "extracted asphaltene" and the "hydrocarbon solvent" used in step (d) of the claim to be a second batch of the asphaltene extracted in step (a) of the claim and a second batch of untainted

Art Unit: 1743

hydrocarbon solvent, respectively. For examination purposes, the claim will be interpreted in this manner.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is not clear what "said extracted asphaltene" and "said hydrocarbon solvent" recited in step (d) of claim 1 are referring to. Presently, the terms "said extracted asphaltene" and "said hydrocarbon solvent" recited in step (d) of the claim refer to the same "extracted asphaltene" and "hydrocarbon solvent" used in step (b) of the claim. It appears from the Specification that Applicants intended the "extracted asphaltene" and the "hydrocarbon solvent" used in step (d) of the claim to be a second batch of the asphaltene extracted in step (a) of the claim and a second batch of untainted hydrocarbon solvent, respectively. For examination purposes, the claim will be interpreted in this manner.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by  
Stephenson et al. (US 5,021,498).

Stephenson et al. disclose a method of determining the effectiveness of an asphaltene dispersant, the method comprising the steps of:

extracting asphaltene from crude oil (see lines 25-30, col. 6);  
dissolving the extracted asphaltene in a heavy aromatic naphtha solvent having a boiling point above 200 degrees Celsius (see lines 29-30, col. 6);  
dissolving the asphaltene/aromatic naphtha solution and an asphaltting dispersant in a hexane solution (see lines 17-23, col. 6); and  
measuring the rate of precipitation of the asphaltene (see lines 31-43, col. 6);  
comparing the difference between said rate of precipitation with the rate of precipitation of a blank, the blank consisting of asphaltene and hexane only (see lines 51-69, col. 6 and Tables I-VI on col. 7-12).

The reference also discloses that the initial ratio of hexane:heavy aromatic naphtha solvent is 10ml:100uL, or 100:1 (see lines 17-25, col. 6). 1 ml of the mixed solvent, which contains ~0.99ml of hexane and ~0.01ml of the aromatic solvent, is then further diluted by 3ml of pure aromatic solvent before conducting a colorimetric analysis

of the precipitation (see lines 38-41, col. 6), which produces a final ratio of hexane:heavy aromatic naphtha solvent to 1:3 if the ratio is calculated using significant figures.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stephenson et al. in view of JT Baker MSDS Catalog (11/02/01) as evidenced by chemfinder.com.

Stephenson et al. disclose the methods of claims 5 and 13, but the reference does not explicitly disclose that the aromatic solvent is selected from the group consisting of benzene, methyl benzene, ethyl benzene, isopropyl benzene, 1,2,3,4-tetrahydronaphthalene and mixtures thereof. However, the reference does disclose that the aromatic solvent used to dissolve asphaltene is a heavy aromatic naphtha solvent having a boiling point above 200 degrees Celsius (see lines 29-30, col. 6).

It would have been obvious to one of ordinary skill in the art to use 1,2,3,4-tetrahydronaphthalene to dissolve the extracted asphaltene since it is colorless (see JT Baker MSDS Catalog) and thus useful for colorimetric observations of the asphaltene

Art Unit: 1743

precipitate. According to [chemfinder.com](http://chemfinder.com), 1,2,3,4-tetrahydronaphthalene is an aromatic naphtha compound having a boiling point of 207 degrees Celsius.

Regarding claims 7-12 and 14:

Although the Stephenson et al. reference discloses all the steps of the method recited in claim 1, it does not clearly elaborate the reasons for using a solvent mixture comprising hexane and a heavy aromatic naphtha having a boiling point above 200 degrees Celsius.

Miller et al. (US 5,925,233) disclose a method similar to the one disclosed by Stephenson et al., the method comprising the steps of:

dissolving asphaltene and asphaltene dispersant in a solution mixture comprising heptane and toluene;

measuring the amount of precipitation; and

comparing said amount of precipitation with the amount of precipitation of a blank containing toluene and asphaltene only.

The reference discloses that an aromatic hydrocarbon (i.e. toluene) is used to solvate the asphaltene and an aliphatic hydrocarbon (i.e. heptane) is used to precipitate the asphaltene since asphaltene is soluble in aromatic hydrocarbons and insoluble in aliphatic hydrocarbons. (see line 40, col. 2 – line 30, col. 3). According to the reference, it appears that any aromatic hydrocarbon capable of solvating asphaltene and any aliphatic hydrocarbon capable of precipitating asphaltene can be used to determine the



effectiveness of asphaltene dispersant in the methods disclosed by Stephenson et al. or Miller et al.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stephenson et al. as evidenced by Miller et al. and in view of Mitchell et al. (US 3,779,902).

Stephenson et al. disclose the method of claim 7, but the reference recites that the alkane solvent is hexane, not cyclopentane as recited in the claim.

Mitchell et al. show that asphaltene is insoluble and forms a precipitate in cyclopentane (see Table 1, col. 8). In light of the evidence supplied by Miller et al., it would have been obvious to one of ordinary skill in the art to use cyclopentane instead of hexane in the method disclosed by Stephenson et al. in situations where hexane is unavailable.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stephenson et al. as evidenced by Miller et al. and in view of Karr, Jr. (US 4,018,663).

Stephenson et al. disclose the methods of claims 8 and 9, but the reference recites that the alkane solvent is hexane, not cyclohexane as recited in claim 8 and that the aromatic solvent is a heavy aromatic naphtha solvent having a boiling point above 200 degrees Celsius, not benzene as recited in claim 9.

Karr, Jr. discloses that asphaltene is soluble in benzene and insoluble in cyclohexane (see lines 19-20, col. 4). In light of the evidence provided by Miller et al., it

Art Unit: 1743

would have been obvious to one of ordinary skill in the art to use cyclohexane instead of hexane and benzene instead of a heavy aromatic naphtha solvent having a boiling point above 200 degrees Celsius in the method disclosed by Stephenson et al. in situations where hexane and a heavy aromatic naphtha solvent having a boiling point above 200 degrees Celsius are unavailable.

Claims 10, 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stephenson et al. as evidenced by Miller et al. and in view of Thorssen et al. (US 5,207,953).

Stephenson et al. disclose the methods of claims 10, 11 and 14, but the reference does not explicitly disclose that the aromatic solvent is toluene or ethyl benzene as recited in claims 10 and 11, respectively.

Thorssen et al. disclose that asphaltene is soluble in toluene and ethyl benzene (see lines 64-67, col. 2). In light of the evidence provided by Miller et al., it would have been obvious to one of ordinary skill in the art to use toluene or ethyl benzene instead of a heavy aromatic naphtha solvent having a boiling point above 200 degrees Celsius in the method disclosed by Stephenson et al. in situations where a heavy aromatic naphtha solvent having a boiling point above 200 degrees Celsius is unavailable.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stephenson et al. as evidenced by Miller et al. and in view of Haney (US 3,617,500).

Art Unit: 1743

Stephenson et al. disclose the method of claim 12, but the reference does not explicitly disclose that the aromatic solvent is isopropyl benzene as recited in the claim.

Haney discloses that asphaltene is soluble in cumene (see lines 49-66, col. 1), which is a synonym for isopropyl benzene. In light of the evidence provided by Miller et al., it would have been obvious to one of ordinary skill in the art to use cumene a.k.a. isopropyl benzene instead of a heavy aromatic naphtha solvent having a boiling point above 200 degrees Celsius in the method disclosed by Stephenson et al. in situations where a heavy aromatic naphtha solvent having a boiling point above 200 degrees Celsius is unavailable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul S. Hyun whose telephone number is (571)-272-8559. The examiner can normally be reached on Monday-Friday 8AM-4:30PM.

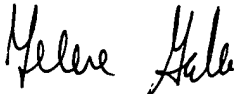
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1743

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PSH

1/20/06

  
**YELENA GAKH**  
**PRIMARY EXAMINER**